Amendments To The Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. (**currently amended**) A garbage data collection method performed during a communication cycle of a plurality of communication cycles of a computing device having memory including writeable non-volatile memory, the garbage data collection method comprising:

performing a mark phase during a communication cycle, the mark phase for making a first list of objects to be deleted from the writeable non-volatile memory;

performing a sweep phase during the communication cycle until deleting all the listed objects of the first list from the memory, wherein the performing of the sweep phase comprises:

calculating a residual time **according to the first list of objects to be deleted** up to a predetermined time limit after processing an external command;

after calculating the residual time, deleting the listed objects of the first list from the memory within the calculated residual time; and

updating the first list of objects to list those undeleted objects of the first list which remain after the lapse of the calculated residual time, and storing the updated first list in the memory~~, such that the objects in the updated first list are available for deletion in another communication cycle, wherein the updated first list stored in the memory is an address list including~~

~~addresses of objects to be deleted from the non-volatile memory, and deletion of the objects is performed using the address list.~~

and wherein, if objects to be deleted remain after performing the mark phase and the sweep phase during the communication cycle, only the sweep phase is performed during the other communication cycles.

2. (previously presented) The method of claim 1, wherein the time limit is determined by a host that transmits the external command or the time limit is determined to be a period of time up to a time guaranteeing QoS that a user does not feel a response delay to the external command.

3. (previously presented) The method of claim 1, wherein the act of making the first list is performed when a garbage collection is requested or when a communication session for receiving the external command is initialized.

4. (previously presented) The method of claim 1, wherein the act of making the list of objects comprises:

adding to the first list any object earmarked for deletion in a prior communication cycle but remaining in the memory undeleted.

5. (previously presented) The method of claim 1, wherein the act of making the list of the objects comprises:

updating the first list of objects when an object is newly generated or deleted

during the command processing.

6. (previously presented) The method of claim 1, wherein the act of deleting the objects of the first list comprises:

making a second list of objects to be deleted from the memory during any residual time remaining after deleting all objects in the first list.

7. (previously presented) The method of claim 1, further comprising:

during the communication cycle, deleting objects of an existing list of objects listing undeleted objects of a prior communication cycle before the external command is processed.

8. (previously presented) The method of claim 1, further comprising:

if the command includes a memory write command or an object delete command, and if there is a list of objects to be deleted from the memory before the write or delete command is processed, performing the deleting of the objects together with the write or delete command.

9. (previously presented) The method of claim 1, wherein the deleting of the listed objects comprises:

if the objects in the first list exist in the memory in a consecutive order, deleting the consecutively ordered objects all together, and if a memory space to be allocated for an object and a memory space of the objects in the first list are consecutively ordered

memory spaces or the same memory space, performing the acts of allocating and deleting together.

10. (**currently amended**) A garbage collection apparatus comprising:

a timer, which calculates a residual time up to a predetermined time limit after processing an external command ; and

a memory management unit, which **performs a mark phase during a communication cycle, the mark phase for making** ~~**makes**~~ a list of objects to be deleted from a writeable non-volatile memory, **and performs a sweep phase during the communication cycle until deleting all the listed objects of the first list from the memory, wherein the sweep phase comprises deleting** ~~**deletes**~~ the listed objects of the list from the memory within the calculated residual time, ~~**updates**~~ **updating** the list of objects to list those undeleted objects of the first list after the lapse of the calculated residual time, and ~~**stores**~~ **storing** the updated first list in memory ~~**such that objects in the updated first list are available for deletion in another communication cycle, wherein the updated first list stored in the memory is an address list including addresses of objects to be deleted from the non-volatile memory, and deletion of the objects is performed using the address list.**~~, **and wherein, if objects to be deleted remain after performing the mark phase and the sweep phase during the communication cycle, only the sweep phase is performed during the other communication cycles.**

11. (previously presented) The apparatus of claim 10, wherein the memory

management unit deletes objects of an existing list of objects listing undeleted objects of a prior communication cycle before the external command is processed.

12. (previously presented) The apparatus of claim 10, wherein the memory management unit, if the command includes a memory write command or an object delete command, and if there is a list of objects to be deleted from the memory before the write or delete command is processed, performs the deletion of the objects together with the write or delete command.

13. (**currently amended**) A computer readable medium having recorded thereon a computer readable program for performing a garbage data collection method performed during a communication cycle of a plurality of communication cycles of a computing device having memory including writeable non-volatile memory, the garbage data collection method comprising:

performing a mark phase during a communication cycle, the mark phase for making a **first** list of objects to be deleted from the writeable non-volatile memory;

performing a sweep phase during the communication cycle until deleting all the listed objects of the first list from the memory, wherein the performing of the sweep phase comprises:

calculating a residual time up to a predetermined time limit after processing an external command;

after calculating the residual time, deleting the listed objects ~~from~~ **of** the **first list from the** memory within the calculated residual time; and

updating the **first** list of objects ~~**to list**~~ **of** those undeleted objects of the first list after the lapse of the calculated residual time, **and storing** ~~**wherein the objects in**~~ the updated **first** list **in the memory** ~~**are available for deletion in another communication cycle, wherein the updated first list stored in the memory is an address list including addresses of objects to be deleted from the non-volatile memory, and deletion of the objects is performed using the address list.**~~

and wherein, if the objects to be deleted remain after performing the mark phase and the sweep phase during the communication cycle, only the sweep phase is performed during the other communication cycles.